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JOURNAL

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JULY, 1838.

On the Sickness and Mortality among the Troops in the West Indies. Prepared from Official Documents, by CAPT. A. M. TULLOCH, F.S.S., &c. &c. Part I., embracing the Windward and Leeward Command.—*(To be continued.)*

[*Read before the Statistical Society of London, on the* 18*th of June*, 1838.]

THE following pages have been framed for the purpose of exhibiting to this Society an Abstract of a Report on the Sickness and Mortality among the Troops in the West Indies, prepared by Mr. Henry Marshall, Deputy Inspector General of Hospitals, and myself, for the information of the Secretary-at-War, by whom it has recently been submitted to Parliament. Those who are anxious to enter into particulars I must refer to the Report itself. This is intended merely as a specimen of the important statistical facts to be deduced from military returns, and the advantages likely to result, both to military and medical science, from the information collected by the medical officers of the British army, in regard to the diseases incident to all the colonies being thus organized and made public.

The troops employed in garrisoning the British Possessions in the West Indies form several Military Commands, of which it is proposed to investigate the statistical details, in the following order:—

I. The Windward and Leeward Command,
II. The Jamaica Command,
III. The Bahamas, and
IV. The Honduras Command.

I.—THE WINDWARD AND LEEWARD COMMAND.

The troops in this military command are employed in garrisoning various islands and possessions, extending from 6° to 17° north latitude, and 56° to 63° west longitude, and including that portion of the American continent termed British Guiana, with the islands of Trinidad, Tobago, Grenada, St. Vincent's, Barbadoes, St. Lucia, Dominica, Antigua with Montserrat, and St. Kitt's with Nevis and Tortola.

These islands form a portion of that chain which stretches across the great gulf separating North from South America; but many of them differ so materially in physical aspect, local peculiarities, and other circumstances by which the health of troops are likely to be affected, that it would be vain to attempt any description sufficiently comprehensive to be applicable to the whole. Trinidad, Tobago, St. Lucia, and Dominica, for instance, are extremely mountainous, covered with dense forests, and intersected by deep and narrow ravines, impervious to the breeze, and in which the rain water, finding no vent, stagnates among a mass of decayed vegetation, creating a moist soil, with a damp climate and a variable temperature; whereas Antigua and Barbadoes are comparatively low, barren, and rocky, with a scanty soil, but little exuberant vegetation, a dry climate, and equable temperature. The other islands possess a kind of intermediate character in these respects; while the coast of British Guiana is totally different from either, being an immense tract of level country, covered with forest, elevated only a few feet above the level of the sea, and, during the rainy season, presenting an almost endless succession of swamps and marshes, with an atmosphere exceedingly humid, though not so variable in temperature as some of the islands first referred to.

The mean height of the thermometer throughout the year is rather under than above the average of similar latitudes, being only about 80½°. In none of the islands is it above 82° or under 79°, and any slight difference in this respect results more from their geological features, or extent of cultivation, than the mere difference of latitude; as the mean temperature of British Guiana, in latitude 6°, is but 80½°, while that of St. Kitt's, more than 12 degrees further to the north, is 81°.

The next peculiarity which extends to this, as well as to most tropical regions, particularly of insular situation, is great uniformity of temperature. The difference between the highest and lowest mean range of the thermometer is, even in the most variable of the islands, only 13°, and in some it is not more than 4° throughout the year; whereas in Britain it is, in most years, upwards of 30°. The heat is generally modified by the trade-wind, which, except from August to December, blows with great regularity from the east and its collateral points. In some of the larger islands there is generally also a land-wind during the night.

In this, as well as other tropical climates, there is but little change in the elasticity or pressure of the atmosphere. The extreme range of the barometer is not more than from a quarter to half an inch throughout the year, and it is not materially affected even by hurricanes; whereas in this country its range is from two to three inches, and it varies with every slight change of weather.

One of the most marked of the atmospherical peculiarities of these regions is the large quantity of rain which falls annually, being, on the average, at least three times as much as in Britain—a necessary consequence of rapid evaporation under a tropical sun. The quantity, however, varies materially in the different colonies, according as their surface is mountainous or level, clothed in wood, or cleared and under cultivation. The Report contains a statement of the fall of rain in each colony, so far as it has been ascertained by measurement; the average quantity throughout the whole command has been estimated at from 60 to 70 inches annually.

The rain of these regions is, however, of a very different character from that of Britain, being confined principally to two seasons of the year, termed the spring and autumnal rains, and then falling, not in gentle showers, but in torrents, which, unless in a very dry soil, or where there is free drainage, speedily inundate the surrounding country.

The four seasons of temperate climates are therefore represented by two wet and two dry seasons; but as the rains follow the course of the sun, it is obvious that the period of their commencement and duration must vary according to the proximity of the settlements to the equator. In Guiana, the most southerly, the spring rains generally extend from December to January, the autumnal from May to August, while in the most northerly of these settlements, the former does not commence till April or May, and the latter extends from October to December.

In many of the islands, particularly the less hilly ones, there is scarcely any deposition of dew, and in others it is generally scanty, except in densely-wooded districts.

In this command two classes of troops are employed, white troops, consisting of the service-companies of different regiments of the line, and black troops, composed of negroes, who are formed into colonial corps. The detail of these will be considered separately.

1. *White Troops.*—The number of white troops employed in this command during the last 20 years, from 1817 to 1836, has varied from 3264 to 5462, the average being 4333: of this force there died in 20 years 7069, being about 85 per 1000 of the strength annually, or nearly six times as many as among the same class of troops in Great Britain, where the mortality is 15 per 1000 annually.

Of this number, however, only 6803 deaths can be accurately traced as having taken place from disease, the remainder were men who died on shipboard or from accidental causes, and who did not come under medical treatment.

Years.	Out of every 1000 White Troops in the undermentioned Colonies the following proportions have died in each year from 1817 to 1836 inclusive.										Average of whole Command.
	British Guiana.	Trinidad.	Tobago.	Grenada.	St. Vincent's.	Barbadoes.	St. Lucia.	Dominica.	Antigua, &c.	St. Kitt's, &c.	
1817	64	257	235	190	148	123	87	559	54	70	162
1818	27	398	176	105	96	77	206	209	35	170	126
1819	73	152	222	68	33	59	92	67	30	9	83
1820	160	30	814	51	36	102	81	63	25	74	105
1821	217	23	270	75	55	121	123	396	49	106	109
1822	77	66	88	45	63	58	394	99	32	15	77
1823	60	60	25	24	71	23	123	76	50	51	49
1824	117	68	54	19	66	49	229	57	20	60	70
1825	94	108	87	57	77	49	93	110	32	126	76
1826	95	92	135	48	55	44	75	133	26	31	68
1827	144	79	67	30	91	34	272	68	54	17	85
1828	134	167	94	135	44	37	60	43	67	39	81
1829	59	21	116	69	36	49	88	97	53	63	58
1830	82	41	148	15	26	49	142	94	30	52	65
1831	110	62	135	21	27	66	74	68	36	25	69
1832	34	73	67	34	50	94	56	91	24	45	64
1833	55	49	75	19	23	36	108	132	43	80	50
1834	53	42	39	27	19	25	73	110	38	44	43
1835	60	62	34	54	26	32	93	141	78	83	57
1836	35	67	269	85	40	53	197	69	37	172	77
Average .	84	106·3	152·8	61·8	54·9	58·5	122·8	137·4	40·6	71·	78·5

As the force is very unequally distributed throughout these colonies, it would be useless, without reference to the strength, to state the number of deaths which took place in each; but the preceding table exhibits the proportion of the strength which died there in every year from 1817 to 1836, inclusive.

This table shews how exceedingly variable is the mortality. In Tobago, for instance, we find that in one year (1820) 4-5ths of the whole force were cut off, and, in several other years, more than 1-4th part have died; yet, in 1825, the mortality was but 25 per 1000. This table also shews how differently the climate of different islands affects the health of the troops. In Tobago, Dominica, and St. Lucia, for instance, the mortality has been from 122 to 152 per 1000, while, in Antigua and Barbadoes it has been only from 40 to 58 per 1000 annually.

Each of these islands, too, seems to affect the health of the troops differently, as regards the diseases from which they suffer. This will be seen by the following table, shewing the annual ratio per 1000 of the strength who died in each colony by the following diseases:—

	Annual Ratio of Mortality per 1000 of White Troops serving at each of the following Colonies.										Average of whole Command.
	British Guiana.	Trinidad.	Tobago.	Grenada.	St. Vincent's.	Barbadoes.	St. Lucia.	Dominica.	Antigua, &c.	St. Kitt's, &c.	
By Fevers	59·2	61·6	104·1	26·3	11·2	11·8	63·1	49·3	14·9	42·1	36·9
Eruptive Fevers . . .	..	..	..	..	·3	..	..	..	..	..	..
Diseases of Lungs. . .	6·4	11·5	11·	6·6	10·5	15·8	12·5	8·3	9·	9·5	10·4
,, Liver . . .	1·	1·1	2·	4·5	1·6	1·4	1·	1·7	2·8	2·2	1·8
,, Stomach and Bowels.	8·9	17·9	24·	16·1	24·2	20·8	39 3	70·3	9·2	10·3	20·7
,, Brain . . .	4·4	4·7	5·	4·6	2·8	3·3	4·3	5·3	1·9	2·8	3·7
Dropsies	1·2	7·7	3·5	·8	1·6	2·4	2·	·7	1·4	·9	2·1
All other Diseases. . .	2·9	1·8	3·2	2·9	2·7	3·0	·6	1·8	1·4	3·2	9·
Total . . .	84·	106·3	152·8	61·8	54·9	58·5	122·8	137·4	40·6	71·	3·5

This shews at a glance the diseases most inimical to the troops in each of these colonies; and it will be observed how marked a difference there is in the effect produced by their climates on the constitution. Tobago is most remarkable for fever; Dominica, for diseases of the bowels and of the brain; Barbadoes, for those of the lungs; Grenada, for those of the liver; while Trinidad is most noted for its dropsies. Each seems in a greater or less degree subject to the operation of some agency highly prejudicial to European life, and which cannot readily be accounted for, either by any perceptible atmospherical agency, local peculiarities, or the nature of the position occupied by the troops, as may be seen by the following brief sketch of each of these colonies.

British Guiana.—Lat. 6° 10′ to 8° N. Long. 56° to 60° W. British Guiana comprehends the settlements on the Rivers Essequibo, Demerara, and Berbice, with their dependencies, extending about 200 miles from east to west along the shores of the South American continent, and from 200 to 300 miles into the interior.

The soil of the whole of this coast is of a deep alluvial nature, and of comparatively recent formation, the immense quantities of deposit annually brought down by the numerous rivers intersecting that portion of the continent having so rapidly gained upon the ocean that, in many parts, its waters have receded three or four miles within the last century.

Owing to this peculiarity in its formation, the country to the distance of many miles from the coast is a vast flat, with no other elevation than what may have been produced by an occasional sand-reef, and, except in the few spots where cultivation has extended, it is covered either with a dense forest of trees, or with rank grass of a gigantic height.

In most parts, the land nearest the sea being somewhat higher than at a short distance inland, water readily accumulates during the rainy season, so as occasionally to inundate a large extent of country; and the forest being in many places too dense to admit of its evaporation, there is always in such situations an accumulation of what is termed bush water, containing great quantities of vegetable matter, and giving rise to noxious exhalations.

The climate throughout the whole of British Guiana is principally distinguished for its extreme moisture: as an instance, no less than 157 inches of rain fell in George Town, Demerara, in the year 1831, being nearly six times the quantity which falls annually in Great Britain; and in 1830 it rained almost continuously throughout the whole year.

Yet, with all these supposed sources of malaria, the mortality has not averaged above 84 per 1000, being nearly the mean of what prevails among the troops throughout the command. Though yellow fever has frequently prevailed there, it has not proved so generally fatal as at some of the other islands enjoying what might be supposed greater advantages in point of situation.

The troops are all quartered in low marshy situations; in fact, there are none other in the colony.

Trinidad.—This island lies adjacent to the South American continent, from which its nearest point is separated by a narrow strait of about 12 miles. It is upwards of 70 miles long, by 50 broad, and in physical aspect presents a striking contrast to the low lands of Guiana, last described. On the northern extremity a bold range of mountains rises to the height of 3000 feet, broken into the most rugged and abrupt forms, and clothed to the summit with forest trees. Towards the south extends a chain of hills, of less elevation, and of a more pastoral character, while the centre of the island is occupied by a group of flat or round-topped hills, dividing it, as it were, into two extensive valleys, which are occasionally intersected by a succession of hill and dale. The whole island is well watered by numerous streams in every direction.

The greater part of the interior is uncultivated, the low grounds forming a succession of marshy plains, and the elevated spots being, for the most part, covered with dense vegetation of forest and underwood. Many parts are understood to be, as yet, unexplored, owing to their unhealthy character and the natural difficulties which the country presents to such an undertaking.

In an island so extensive, mountainous, and covered with forest, it may be supposed that the atmosphere is generally overloaded with moisture. It does not appear, however, that the quantity of rain which falls is so great as in Guiana, the average being about 65 inches annually, and this is said to be diminishing very materially with the progress of cultivation. In 1830 rain fell on 211 days.

The nights in this island are generally cool and pleasant, but the temperature during the day is much the same as at the other stations in the command.

Here the mortality has averaged 106 per 1000; but it is worthy of remark, that a great portion of it occurred from 1817 to 1820; since then various improvements in the positions of the troops have taken place, and the mortality has been reduced to the average of the other stations in the command.

Tobago.—This island lies close to Trinidad, from which its western extremity is distant only 6 miles. It is 32 miles in length, and 12 in breadth; on the north extremely rugged and mountainous, and from the sea appears like a mass of dark abrupt precipices. Towards the south and west the ground descends into a succession of conical hills and ridges of no great elevation, which, as they approach the sea, terminate in broken plains and low lands. The eastern district is also of a mountainous character. The soil in the valleys is generally a rich dark mould, and is well watered by numerous streams and rivulets. Cultivation being for the most part confined to a portion of the low lands near the sea on the south side of the island, the greater part of the interior is still in a state of nature, the high grounds covered with forests, the deep ravines choked up with vegetation, and the bottoms of the valleys, being very narrow and not possessing free drainage, generally of a wet marshy character.

The climate and seasons here are much the same as at Trinidad, only rather more humid; but we possess no measurement of the quantity of rain which falls annually. In some of the low grounds, excluded from the influence of the breeze, the heat is described as exceedingly oppressive, particularly at Scarborough, the capital, which lies at the foot of a hill on the south side of the island.

The troops, however, enjoy the advantage of a more moderate temperature, being quartered in Fort King George, on the summit of the hill above Scarborough, where the heat is modified by a constant breeze, and does not exceed the usual average in this command.

This is an extremely unhealthy island as the results will testify; nearly 153 per 1000 of the strength having perished annually during the last 20 years. This was not always the case, for during the 10 years prior to 1817, the mortality only averaged 50 per 1000, and invalids were often sent there from other islands for the benefit of their health. It is impossible to say to what causes so marked a deterioration of climate is to be ascribed.

We have stated that in one year 4-5ths of the force were cut off: the particulars of this extraordinary mortality are as follows :—

Several cases of fever, of a malignant type, occurred among the York Rangers employed in this island, during the year 1818 and part of 1819. On the 10th of April in the latter year, they were relieved by two companies of the 4th Regiment. This detachment remained tolerably healthy till about the middle of February, 1820, when an extremely fatal yellow fever broke out, and attacked all classes indiscriminately, as will be seen by the following return of the deaths from the 10th of

April, 1819, when the detachment landed in the island, till the 10th of September, 1820, when it embarked for Barbadoes :—

	Strength.	Treated for Fever.	Died by Fever.	Recovered from Fever.	Escaped Fever entirely.
Commissioned Officers . .	6	5	5	..	1
Non-Commissioned Officers and Privates	123	116	84	32	7
Women	11	11	8	3	..
Children	6	6	3	3	..
Total	146	138	100	38	8

This mortality occurred chiefly between the middle of February and the 8th of July. Of the 109 deaths which occurred in 1820, 107 were from fever alone.

An epidemic of a similar character, though not quite so fatal, occurred in 1801, when upwards of half the white troops in garrison were cut off; and when it proved so virulent, particularly among the white inhabitants of the town, that, of 63 persons attacked, only 2 recovered.

This disease seems to have made its appearance, and raged with equal violence, at all seasons of the year. In 1818 it was particularly fatal in December, and continued so during January and February of the following year. In 1820 it began in February, and raged till July; then re-appeared in November, and continued till February, 1821. In 1830 it broke out in July, and was most fatal in October. There seems thus to have been no uniformity in the periods at which sickness and mortality were most prevalent at this station.

Grenada.—This island is about 25 miles in length, and 12 in breadth, and lies about 60 miles north-west from Tobago. It is traversed throughout its whole length from north to south by an irregular range of mountains, rising to the height of more than 3000 feet, from which others of less elevation branch off in a lateral direction, forming a succession of rich extensive valleys, which, as they approach the sea, particularly on the south-east or windward side of the island, open into level alluvial plains. On this side there is also a considerable extent of low swampy ground, where, in the autumnal season, fevers of a very severe type are of frequent occurrence; but there are no troops quartered in that neighbourhood.

Though Grenada is mountainous, yet it is neither overgrown with dense vegetation, nor are its high lands of the same abrupt inaccessible nature as those of Tobago. The valleys are open, and most parts of the island admit of free cultivation; indeed, so far back as 1776, 2-3rds of it were under crop. The soil consists, principally, of a rich black, or reddish, mould, which is well watered in every direction by numerous small streams from the mountains; and in the centre of the island are several hill-lakes of considerable magnitude.

The fall of rain is very considerable, amounting to about 65 inches annually. The mean temperature is rather higher than in the other islands.

The troops are principally quartered on Richmond Heights, 700 feet above the town. The mortality has been comparatively low, being under 62 per 1000 annually. Fever has been remarkably rare, particularly of late years. This, however, was not always the case, for in 1794 yellow fever raged with dreadful violence. Every house was the abode of death; men long resident found no security; young and old, temperate and intemperate, were alike affected by it. Thus, though the extent of cultivation, or other physical peculiarities of Grenada, may tend to render this disease of less frequent occurrence than in the colonies we have just described, there are periods in which these supposed sources of salubrity prove of no avail in procuring immunity from its ravages.

It is an extraordinary feature in the diseases of this island that those of the liver should prove such a source of mortality among the white troops; the deaths from that class being nearly thrice as high as at the other stations in the command. We are unable to trace any cause to which this peculiarity can be attributed.

St. Vincent's.—This island is 18 miles long, and 11 broad, and lies about 70 miles to the north-east of Grenada. Its centre is occupied by a lofty range of mountains, which in some parts attain the height of 4000 feet, but rapidly decline towards the sea, leaving a considerable extent of low lands on either side, somewhat uneven in surface, but affording rich crops. The island is of volcanic origin; from one of its mountains (the Souffrière) there have been frequent eruptions—that of 1812 caused great devastation. At the base of this mountain is an extensive plain of nearly 6000 acres of most productive land; and to the north, in the Carib country, there is also a considerable extent of level and fertile ground.

The mountains are clothed from the base to the summit with immense forest trees; but the ground having everywhere the advantage of a gradual slope, and there being little jungle or brushwood, ventilation is not impeded. The valleys also are sufficiently wide and free from excessive vegetation to give a healthy character even to the uncultivated portion of the island; and there is little swampy ground, except in some spots near the sea, where the action of the waves has thrown up a barrier, which obstructs some of the small streams during heavy rains, and causes them for a time to overflow their banks.

In the valleys the soil chiefly consists of a rich black mould, or a mixture of clay and sand: in the high grounds it is of a light sandy character. The whole island is well watered by numerous rivulets; but only about 1-3rd of its surface is under cultivation.

Owing to the height of the mountains, and their being shrouded in wood which attracts the clouds, the atmosphere of this island is generally humid, and rain is common during most of the year. In 1832, for instance, it fell on 298 days, and in 1822 on 261 days; the average quantity throughout the year is from 70 to 80 inches, and even considerably more on the high grounds; the dews are also very heavy. The temperature is about the average of what prevails at the other islands in the command; but from July to October it is rather more variable.

This island has enjoyed a considerable exemption from the general mortality, except in 1817, when it was attributable to the accidental circumstance of a corps being sent there in very bad health from another island. The average, even including that year, has been under 55 per 1000 annually. The troops are principally quartered in a fort 600 feet above the level of the sea.

Barbadoes.—This island lies about 60 miles to the east of St. Vincent's, and extends 22 miles in length, by 14 in breadth. When viewed from the sea it appears arid and rocky, exhibiting little of that exuberant vegetation which characterises most of the other islands in this command. The north, south, and western districts consist principally of low land, rising by a succession of terraces towards the north-east and south-east, where there is a considerable extent of high ground, formed by a number of steep and conical hills, with deep intervening valleys: the greatest elevation in the island, however, does not exceed 1100 feet. Most of these hills are naked and barren; but others, particularly towards the interior, are richly clothed with verdure, and present a striking contrast to the flat uninteresting features of other parts of the island. The soil is in general very scanty in the upland districts. In the lowlands it is mostly calcareous, extremely light and absorbent, soon dry after the heaviest rains, and all under cultivation. There is only one marshy spot of any extent in the island; it lies about 3 miles to windward of the garrison, close to the sea, and is generally overflowed by the tide, but it does not appear to exercise any prejudicial influence on the health of the troops.

The climate of Barbadoes is much the same as that of St. Vincent's, except that the quantity of rain is considerably less—the average amounting only to 58 inches annually. There is very little dew, and seldom any humidity of atmosphere. Owing to the flatness of the island, and it being open in almost every part to the sea-breeze, the heat is in general less felt, though the thermometer ranges fully as high as in any of the other islands. The troops are principally quartered on an eminence overlooking the capital, where they have a constant breeze and diminished temperature.

The troops in this island have enjoyed a very considerable exemption from the general mortality, the deaths having averaged only 58½ per 1000 of the strength.

Diseases of the bowels constitute more than a third part of the whole deaths, and seem not to be diminishing of late years, either in frequency or severity. They proved most fatal in 1817, when dysentery was extremely prevalent, particularly in the 2d, or Queen's Regiment; so much so that about the middle of the year nearly half of that corps were in hospital from it. Various means were adopted to protect them against the influence of this disease, but without effect.

The low ratio of mortality by fever is one of the most striking features in the diseases of the white troops at Barbadoes; it scarcely amounts to a third part of the general average throughout the command; and since 1822 the deaths from this cause have not exceeded 4½ per 1000 of the strength annually, being less than in the Mediterranean. No such exemption, however, is manifest prior to that period; for in 1817 it cut off nearly 4 per cent. of the force, and in 1820 appeared in an epidemic form about the end of October, increased in severity during November and December, and terminated in the end of January. In 1821 it re-appeared almost exactly at the same period, attained its height in November, and ceased in the middle of January, though a few cases occasionally occurred till March. The disease in both these years was of the very worst type, and fatal to a large proportion of those attacked, though it did not spread very generally among the troops. It affected equally the temperate and intemperate, and among the officers was even more virulent in its character than among the privates. Of 8 officers attacked, in 1821, 6 died, and in the 4th Regiment, out of 5, not one recovered.

On both these occasions the weather was more than usually cool and pleasant, and but little rain fell. No atmospherical changes seemed to produce the slightest influence on the disease.

St. Lucia.—This island extends nearly 32 miles in length and 12 in breadth, and lies about 40 miles to the north of St. Vincent's. It comprises two districts, differing in physical aspect, but each in an eminent degree subject to the operation of those agencies which are supposed to exert a baneful influence on the health of Europeans in tropical climates. Basseterre, the lowest and best cultivated portion of the island, abounds in swamps and marshes. Capisterre, the more elevated part, consists of a succession of abrupt mountains of the most picturesque and fantastic shapes, covered to the summit with forest trees and dense underwood, and intersected by numerous ravines, which, being too narrow to admit of free ventilation, are at all times replete with moisture, and choked up with decayed vegetation in every stage of decomposition.

The climate is principally characterised by its extreme moisture and variableness. We possess no specific measurement of the quantity of rain which falls annually, but it is stated to be sometimes very great; indeed, during several months, but particularly in October and November, it is incessant, and showers are frequent for at least nine months in the year. The quantity which falls is, however, variable, and in some years even scanty. Cool dry weather generally sets in about Christmas, and continues for three or four months, at which time the climate is exceedingly pleasant. During the rest of the year the weather is sometimes dry and sultry, at others cold and damp, exhibiting a difference of from 10 to 12 degrees of temperature in the course of a few hours. The troops are principally quartered on a height 850 feet above the level of the sea.

This island has been remarkably fatal to the troops. The mortality has averaged 123 per 1000 annually; and on several occasions during the last 20 years from one-third to one-fourth of the troops have been cut off.

St. Lucia has always been noted for the extreme insalubrity of its climate to white troops, particularly as manifested in fevers and diseases of the bowels; for we find it stated by Sir Gilbert Blane *, that out of a mean force of 1630, comprising the garrison in 1780-1, no less than 1639 were cut off, being more than the average strength in one year, the greater part of whom fell victims to these diseases. Though we have not had to record any such extraordinary instance of mortality during the period which has come under our investigation, still there seems very little amelioration in the climate during the last 20 years.

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* Medico-Chirurgica Transactions, vol. iii.

Whatever the causes of disease may be, they continue in active operation.

Opposite to St. Lucia is a small island called Pigeon Island, which was formerly esteemed more healthy than St. Lucia, and used as a convalescent post; but in 1836, out of 55 stationed there, 25 died—22 from dysentery and 3 from fever.

Dominica.—This island is about 29 miles in length and 16 in breadth, and lies nearly midway between the French settlements of Martinique and Guadaloupe. It is upwards of 100 miles to the north of St. Lucia, which it very much resembles in physical aspect, the interior being composed of a bold range of rugged mountains rising to the height of more than 5000 feet, and intersected by deep ravines, which occasionally open out into narrow valleys; the whole clothed with a dense vegetation of forest-trees and shrubs, except in the few spots which have been brought under cultivation.

Dominica is apparently of volcanic origin; the soil in the interior is generally a light brown mould, but towards the sea-coast, and in the openings of the valleys, it is a deep black earth well adapted for cultivation. The island is watered throughout its whole extent by 30 rivers of considerable magnitude, and numerous rivulets. The combination of wood, water, and mountain scenery, which almost every part of it presents, however pleasing to the eye, seems to favour the development of diseases most inimical to the constitutions of Europeans.

The climate differs but little from that of St. Lucia, except that the rainy season is later in its commencement and termination.

The troops are principally quartered on the summit of a rock 450 feet high, where the temperature is considerably under the mean of the whole command, yet the mortality is higher than at any of the other stations. It has averaged during the last 20 years 135 per 1000 of the strength, and in 1817 more than half the garrison was cut off. In that year 216 cases of fever were admitted into hospital, of whom 74 died, or 1 in 3; of acute dysentery, 160 cases, of whom 42 died, or 1 in 4; and of chronic dysentery, 179 cases, whereof 41 died, being nearly in the same proportion. The meteorological phenomena evinced nothing remarkable during that period, to which the sufferings of the troops could in any respect be attributed.

In 1821 the fever appeared in September, and continued to rage with great violence during the two following months; in the course of which almost every white soldier on the island was attacked, and a third of the force perished. The weather at this period is described as hot and sultry, but there was no other peculiarity worthy of notice.

Antigua and Montserrat.—The island of Antigua lies about 90 miles N. N. W. of Dominica, and is of an oval shape, 20 miles in length and 54 in circumference. It possesses little of that mountainous character which we have remarked in most of the islands previously described, the greatest elevation being 1210 feet; and on approaching it from the sea, instead of mountains covered with rich foliage and vegetation, nothing is visible but a barren rugged coast, almost destitute of verdure. The high grounds are principally on the south and south-west side of the island, and consist of a succession of round-peaked hills partially covered with small trees and brushwood, and intersected by well-cultivated valleys. These hills sink rapidly towards the north-east, on which side a large portion of the island is low, and in many parts swampy.

The soil in the high lands is a reddish clay on a substratum of marl, that in the low lands a rich dark mould on a substratum of clay. The soil is extremely dry, as, with the exception of a few small rivulets among the hills, the island is destitute of running water.

The climate of Antigua is principally remarkable for a want of moisture; indeed, the average fall of rain is not above 45 inches annually; a very small quantity, considering the rapid evaporation which takes place under a tropical sun. Even the dew is but scanty, and the island often suffers from severe droughts. The rainy season is very uncertain, but may be said to extend from June to the end of the year, though a considerable quantity falls also in the other months.

Owing to the general dryness of the atmosphere, the alternations of temperature are but slight, the thermometer seldom ranging more than 4 degrees in the 24 hours. The mean temperature is also rather under the average of the Windward and Leeward Command.

The island of Montserrat, which forms a dependency of Antigua, and where a portion of the troops is generally stationed, lies about 22 miles south-west of it, and is about 12 miles long and 7 broad. It consists of a range of steep abrupt mountains, or rather, perhaps, of one lofty mountain, 2500 feet high, of which the summit has been broken into a variety of precipices and deep chasms, but the base slopes off towards the sea by a succession of gentle ridges admitting of cultivation. With the exception of the town of Plymouth, which is unfavourably situated near the beach, having an amphitheatre of hills in its rear intercepting the sea-breeze, the island enjoys a high character for salubrity. The barracks of the troops at Antigua are elevated above 400 feet. The mortality there has been uniformly low as compared with the others, the average being only 40 per 1000. Fever has been by no means very prevalent of late years, but in 1816 it was extremely so.

St. Kitts, Nevis, and Tortola.—The island of St. Christopher's lies about 50 miles north-west of Antigua, and is of an irregular oblong form, measuring nearly 72 miles in circumference. A chain of barren rugged hills runs through the centre from north to south, in the midst of which stands Mount Misery, about 3711 feet high, and of volcanic origin. From the foot of these hills the ground slopes gradually to the sea, is all under cultivation, and exceedingly fertile. The soil in the low grounds is a dark grey loam, very light and porous, through which water percolates so quickly that it is quite dry within an hour after the heaviest rains. The island is not so well watered as most of the others we have described, there being only four streams in it of any magnitude.

The climate, like that of most mountainous regions within the tropics, is subject to great vicissitudes; the vapour drawn up during the day descending in the afternoon and evening, causes at these periods a considerable reduction of temperature, particularly from November to April. More rain falls than in the adjacent island of Antigua, especially during October, November, and December, but we possess no exact measurement of the quantity.

The principal barracks occupied by the troops in St. Kitt's are on Brimstone Hill, situated on the south-west side of the island, about 700 feet above the level of the sea. This hill is detached from all the others, and is precipitous on every side except where a narrow winding road forms an approach to it from the beach. It is almost entirely composed of limestone mixed with chalk. The barracks are built on several little platforms on the hill. There are also detachments at Nevis and Tortola, two islands at some distance, but of which our limits will not admit of furnishing any particulars.

The general mortality of these three islands has been 7 per cent., of which 4 per cent. arise from fever. If our estimate of the climate of St. Kitt's was to be founded on this statement alone, we should suppose fever to be a greater source of mortality than in the other islands, whereas, till last year, it was for a long period remarkably exempt from it. The greater proportion of the deaths by fever in 1820, 1821, and 1825, occurred among the detachment at Nevis; and even last year 14 of the deaths from that disease occurred at Tortola. On this occasion, however, it extended to St. Kitt's, and raged with great violence among the troops at Brimstone Hill and Basseterre, commencing at the latter station, from which it gradually extended itself throughout the whole island, and ultimately cut off nearly an eighth of the white troops stationed there. This remarkable visitation was preceded by no perceptible change in the atmosphere, nor was there any alteration in the locality or condition of the troops to which it could be attributed. Nevis, where the disease generally prevails, was this year almost exempt from it.

This concludes our remarks on the relative mortality in these colonies. With regard to the extent of sickness by different diseases no separate estimate has been made for each colony. But, generally throughout the whole command, the number of white troops admitted into hospital in the course of 20 years, by each class of diseases, was as follows :—

	Admissions.		Deaths.	
	Total among whole Force in 20 Years.	Annual Ratio per 1000 of Mean Strength.	Total among whole Force in 20 Years.	Annual Ratio per 1000 of Mean Strength.
Fevers	62,163	717	3,195	36·9
Eruptive Fevers	13	$\frac{2}{10}$	1	. .
Diseases of the Lungs	9,975	115	906	10·4
,, of the Liver	1,946	22	161	1·8
,, of the Stomach and Bowels	36,474	421	1,795	20·7
,, of the Brain	2,447	28	312	3·7
Dropsies	659	$7\frac{8}{10}$	180	2·1
Rheumatic Affections	4,202	49	17	2·9
Venereal ,, ...	3,043	35	6	
Abscesses and Ulcers	17,708	204	18	
Wounds and Injuries	11,149	129	60	
Punished	4,327	50	2	
Diseases of the Eyes	7,686	89	4	
,, of the Skin	559	6	1	
All other Diseases	2,584	30	145	
Total	164,935	1,903	6,803	78·5

One of the principal features worthy of remark in this table is the great prevalence and fatal character of diseases of the lungs. Of the 9975 cases reported under this head there were from—

	Attacks.	Deaths.
Inflammation of Lungs . .	1,941	112
Pleurisy	34	1
Spitting of Blood	303	34
Consumption	1,023	580
Acute Catarrh	5,108	49
Chronic Catarrh.	1,409	127
Asthma	92	2
Difficulty of Breathing . .	63	1
Hooping Cough	2	0
	9,975	906

Though the proportion of admissions by this class of diseases is lower than among troops in the United Kingdom, in the proportion of 115 to 148, the ratio of mortality is much higher, as nearly 10½ per 1000 of the strength have been cut off annually; whereas in Britain the deaths from the same class of diseases do not average, at the utmost, more than 8½ per 1000. This arises from the greater prevalence of consumption; for out of an aggregate strength of 86,661, serving in the Windward and Leeward Command, not fewer than 1023 were attacked by that fatal disease, being 12 per 1000 annually, while out of an aggregate strength of 44,611 dragoon guards and dragoons serving in Great Britain, only 286 were attacked, being about 5¼ per 1000.

Not only is consumption productive of great mortality in this command, but inflammation of the lungs and chronic catarrh are nearly twice as prevalent and twice as fatal as among troops in Britain, thus shewing how little effect a mere increase of temperature has in modifying these diseases. The only disease of this class from which the troops in this command appear for some years to have enjoyed any exemption is acute catarrh; but there has been a remarkable increase in the cases since 1823 and 1824, and of late years at least four times as many have been attacked by it as previous to that period. Another remarkable feature is, the comparative exemption from venereal affections, only 35 per 1000 having been attacked by it annually of the troops serving in this command, while in Britain and other stations where it is common, 180 per 1000 are attacked annually.

This concludes the principal observations we have leisure to make in regard to the white troops in this command; the effect of the climate of Jamaica on those serving there will next be illustrated.

On the Relative Frequency of Pulmonary Consumption and Diseases of the Heart. By John Clendinning, M.D.

Wimpole Street, May 31, 1838.

Sir,

In delivering the Croonian Lectures for 1838, I have had occasion to lay before the Royal College of Physicians the results of experiments and observations I have made relative to the physical condition of the human heart under various circumstances of health and disease; and as